

Applicants: Visser et al.  
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Docket No. 294-52 CIP

### **REMARKS**

The subject matter of claims 19-21 is rejected under 35 U.S.C. §103(a), as being obvious over the combination of Kossmann et al. (U.S. Patent No. 6,207,880) and Shewmaker et al. (U.S. Patent No. 5,349,123). The subject matter of claims 16-18 is rejected under 35 U.S.C. §103(a) as being unpatentable over Verberne et al. (U.S. Patent No. 3,890,888) in view of Mitchell et al. (U.S. Patent No. 4,285,735), and further in view of Tallberg et al. (U.S. Patent No. 5,824,798).

Applicants have amended claims 16, 19 and 20. Applicants have added new claims 22 to 27. Accordingly, claims 16 to 27 are pending.

### **Present Invention**

The present invention provides a cassava starch which has a surprisingly high amylopectin content, and a method of isolating the same. In particular, the cassava starch provided by the present invention contains at least 95 wt.% amylopectin. In contrast, naturally-occurring tuber starches, such as cassava starch, comprise less than 85 wt.% amylopectin.

**Rejection under 35 U.S.C. §112**

Claim 20 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for improperly depending from claim 16. (Office Action, page 3, first full paragraph.) The dependency of claim 20 has been corrected. Accordingly, this rejection is obviated.

**First Rejection under 35 U.S.C. §103(a)**

The subject matter of claims 16-18 is rejected under 35 U.S.C. §103(a) as being unpatentable over Verberne et al. in view of Mitchell et al., and further in view of Tallberg et al. According to the Examiner, these references variously disclose the methods of isolating starch as described in the claims.

Claim 16 has been amended to include the following additional method step, "providing a cassava tuber wherein the tuber comprises starch that has an amylopectin content of at least 95 wt.% based on the dry substance weight of the starch." None of the cited prior art references disclose such a step.

Verbene et al. describe a method of recovering juice and starch from root crops, such as potatoes and cassava tubers. (See col. 1, lines 5-10.) Verbene et al. do not disclose cassava starches with a high amylopectin content.

Mitchell et al. describe a process for making a fructose mixture. (See col. 1, lines 5-10). Mitchell et al. do not disclose cassava starches. Moreover, Mitchell et al. do not disclose cassava starches with a high amylopectin content.

Tallberg et al. describe genetically-engineered modification of potato with a high amylopectin content. (See col. 1, lines 10-17). Tallberg et al. do not disclose cassava

starches. Moreover, Tallberg et al. do not disclose cassava starches with a high amylopectin content.

In order for a *prima facie* case of obviousness to be made, a prior art reference must teach or suggest all the claim limitations. The cited references do not teach cassava with a high amylopectin content. Accordingly, the cited references do render the claims of the present application obvious, and withdrawal of this rejection is respectfully requested.

**Second Rejection under 35 U.S.C. §103(a)**

The subject matter of claims 19-21 is rejected under 35 U.S.C. §103(a), as being obvious over the combination of Kossmann et al. and Shewmaker et al.

The parent application (U.S. Patent No. 6,551,827 (U.S.S.N. 09/180,481)) of the present CIP application claims priority to PCT Application No. PCT/NL97/00285, filed May 20, 1997. The subject matter of the present application, for which there is support in the parent patent, is entitled to the benefit of the PCT priority date.

The subject matter of claims 19-21 of the present application are supported in the parent patent. Claim 19 recites a starch obtainable by a method comprising isolating a starch from a cassava plant wherein the starch has an amylopectin content of at least 95 wt.%. Specific support for this claim can be found throughout the parent patent. For example, see col. 3, lines 1-2, of the parent patent. It is stated that, "Another embodiment of the invention is the manipulation of starch in the cassava tubers."

Also, the methods of the invention comprise producing protoplasts that can be regenerated into cassava plants which provide the high amylopectin starch. These methods have been enabled in the parent patent.

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The filing date of Kossmann et al. is March 19, 1998. Thus, the filing date of Kossmann et al. is after the priority date of the parent patent. It follows that the filing date of Kossmann et al. is after the priority date that the subject matter of claims 19-21 can claim. Therefore, Kossmann et al. should be removed as a prior art reference. Accordingly, the present obviousness rejection is moot.

Moreover, even if Kossmann et al. is not removed as a prior art reference, claims 19-21 are not rendered obvious.

Claim 19 has been amended to include the following additional method step, "providing a cassava tuber wherein the tuber comprises starch that has an amylopectin content of at least 95 wt.% based on the dry substance weight of the starch." None of the cited prior art references describe and/or enable such a step.

Naturally-occurring cassava starch comprise less than 85 wt.% amylopectin. The present invention provides cassava starch, and methods of making the same, which comprises at least 95 wt.% amylopectin. The Examiner states that the prior art references provide methods of transforming cassava to provide such high amylopectin cassava starch. However, it is well known that the transformation of cassava cells is recalcitrant. Before the present invention, attempts to produce cassava plants from protoplasts have not been successful. Applicants had filed a 1.132 Declaration in the parent application (U.S. Patent No. 6,551,827 (U.S.S.N. 09/180,481)) which evinced such recalcitrance. A copy of the Declaration is enclosed. A more specific review of the cited references follows.

Shewmaker et al. disclose plant vectors which contain glycogen biosynthetic enzyme sequences. **Shewmaker et al. just describe transformation of potato cells.** Although they may mention cassava in a list of “[p]lants of interest” they do not enable the transformation of cassava cells. (See col. 10, lines 27-30, of Shewmaker et al.)

Kossmann et al. disclose methods of modifying the amylose/amylopectin content of starch. However, **Kossmann et al. just describe transformation of potato cells.** Although they do state that “[t]he method of the invention may *in principle* be used for any kind of plant species,” and do mention cassava, they do not enable the transformation of cassava cells. (See col. 11, lines 7-12. Emphasis added.)

New claims 22 and 23 recite methods to obtain cassava starch with a high amylopectin content which include the step of transforming protoplasts of cassava. Claims 24 and 25 are product by process claims based on claims 22 and 23.

New claims 26 and 27 recite methods for obtaining cassava starch which include the step of providing cassava tubers comprising high amylopectin starch, and isolating the starch. Claims 19 and 20 are product by process claims corresponding to claims 26 and 27.

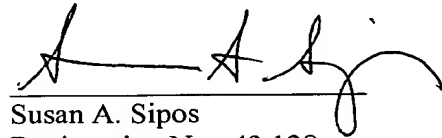
In summary, the cited prior art does not enable obtaining starch from a cassava plant which contains at least 95 wt.% of amylopectin. Therefore, the present invention is not obvious over the cited prior art. Withdrawal of this rejection is respectfully requested.

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Applicants respectfully submit that the application, including claims 16-27, is now in condition for allowance, which action is earnestly solicited. If resolution of any remaining issue is required prior to allowance of this application, it is respectfully requested that the Examiner contact Applicants' undersigned attorney at the telephone number provided below.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Susan A. Sipos', written over a horizontal line.

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